

Leveraging ACPI_PSS data to Estimate Energy of Processor Core between ACPI-Cpufreq and Intel P-State Driver on Low-End Intel Pentium Celeron N2830

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ABSTRACT. *Measuring energy of processor core which consumed by a program is a prerequisite when we want to optimize source code of a program in order to gain efficiency of energy. However, it's difficult to find tools to measure energy of processor core especially on low-end processor. In this paper we offer a simple energy estimation as an alternative tool by leveraging an object in ACPI (Advanced Configuration and Power Interface) specification called _PSS (Performance Supported States) which contains information about power of each processor core in each state of its performance states (P-States). To estimate the energy of processor core, we integrate power of each processor core during run time of a program. A program was run repetitively in different conditions on minicomputer Intel DN2820FYK which consists of low-end processor Intel Pentium Celeron N2830. We collected frequency of cores while running the program. We then mapped the frequency into power based on _PSS information to construct graph of power vs. time as a base to estimate the energy by using trapezoid method of integration. Since the processor behavior is also determined by a driver, we compared the effect of drivers between driver ACPI-cpufreq and driver Intel-P-State toward energy consumed. We also made some experiments by implementing combinations of policy, frequency, feature of boosts and load. In this paper, we find out that by leveraging _PSS data, we can easily estimate energy of processor core. We also find out that by using driver Intel P-State, it will be better and easier to estimate energy rather than using ACPI-cpufreq.*

Keywords: Energy, Simple, Core, _PSS, Low-End N2830